CLAIMS

What is claimed is:

1. A method for making a rubber composition comprising:

(a) forming a mixture by combining an uncured or partially cured elastomeric material, a curing agent that reacts with the elastomeric material, and a reactive oligomer comprising a compound that polymerizes to form a thermoplastic polymer matrix of the composition; and

(b) heating and applying mechanical energy to the mixture at a temperature and for a time sufficient to effect vulcanization of the elastomeric material and polymerization of the reactive oligomer.

2. A method according to Claim 1, wherein the elastomeric material comprises a fluorocarbon elastomer.

3. A method according to Claim 1, wherein the elastomeric material comprises a diene rubber.

4. A method according to Claim 1, wherein the elastomeric material comprises a silicone rubber.

5. A method according to Claim 1, wherein the elastomeric material comprises an ethylene propylene rubber.

6. A method according to Claim 2, wherein the fluorocarbon elastomer is selected from the group consisting of: VDF/HFP, VDF/HFP/TFE, VDF/PFVE/TFE, TFE/Pr, TFE/Pr/VDF, TFE/Et/PFVE/VDF, TFE/Et/PFVE, and TFE/PFVE.

7. A method according to Claim 6, wherein the fluorocarbon elastomer also comprises cure site monomers.

8. A method according to Claim 2, wherein the curing agent comprises a polyol.

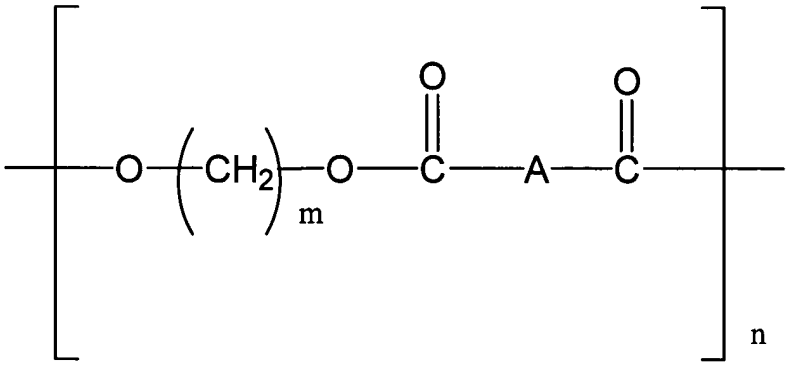
9. A method according to Claim 2, wherein the curing agent comprises a peroxide.

10. A method according to Claim 3, wherein the curing agent comprises sulfur.

11. A method according to Claim 1, wherein the oligomer polymerizes to form a thermoplastic polyester.

12. A method according to Claim 11, wherein the oligomer polymerizes to form polybutylene terephthalate.

13. A method according to Claim 11, wherein the oligomer is made by a process comprising combining a polyester and a depolymerization catalyst in an organic solvent, wherein the depolymerization catalyst comprises a tin compound or a titanium compound, and wherein the polyester is described by the formula



wherein m is from 2 to 10, n is from about 20 to about 500, and A is a divalent radical selected from the group consisting of alkylene, monocyclic aromatic, and polycyclic aromatic.

14. A method according to Claim 11, wherein the oligomer is a macrocyclic polyester oligomer.

15. A method according to Claim 1, wherein the oligomer polymerizes to form a thermoplastic polyamide.

16. A method according to Claim 1, comprising a continuous process.

17. A method according to Claim 16, carried out in a twin screw extruder.

18. A method according to Claim 1, comprising a batch process.

19. A method for making a processable rubber composition, comprising

(a) forming a mixture of an uncured or partially cured elastomer material and a reactive oligomer; and

(b) simultaneously curing the elastomeric material and polymerizing the oligomer in the mixture;

(c) wherein the oligomer polymerizes to form a thermoplastic material by ring opening or condensation polymerization.

20. A method according to Claim 19, wherein the oligomer does not react with the elastomer.

21. A method according to Claim 19, wherein the elastomeric material comprises a fluorocarbon elastomer.

22. A method according to Claim 21, comprising curing the fluorocarbon elastomer with a phenolic curing agent.

23. A method according to Claim 21, comprising curing the fluorocarbon elastomer with a peroxide curing system.

24. A method according to Claim 19, wherein the oligomer polymerizes to form a thermoplastic polyester.

25. A method according to Claim 19, wherein the oligomer polymerizes to form polybutylene terephthalate.

26. A method of making a processable rubber composition, comprising

(a) combining a partially cured or uncured elastomeric material, a curing agent that reacts with the elastomeric material, and a reactive oligomer comprising a macrocyclic polyester oligomer;

(b) mixing the combination to form a homogeneous blend; and

(c) heating the blend while mixing to effect cure of the elastomeric material and polymerization of the oligomer.

27. A method according to Claim 26, wherein the elastomeric material comprises a fluorocarbon elastomer.

28. A method according to Claim 26, wherein the elastomeric material comprises a diene rubber.

29. A method according to Claim 26, wherein the oligomer is prepared by depolymerizing polybutylene terephthalate in an organic solvent in the presence of a tin compound or a titanium compound.

30. A method according to Claim 27, wherein the fluorocarbon elastomer comprises repeating units derived from tetrafluoroethylene and propylene.

31. A method according to Claim 27, wherein the fluorocarbon elastomer comprises repeating units derived from vinylidene fluoride and hexafluoropropylene.

32. A method according to Claim 26, comprising a continuous process.

33. A method according to Claim 26, carried out in a twin screw extruder.

34. A method according to Claim 26, comprising a batch process.